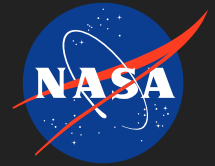


# Gradient Transport Correction (GTC): A General Confinement Method for Better Simulation of Rotor Wake and Vortex-Dominated Flows,

## Phase I

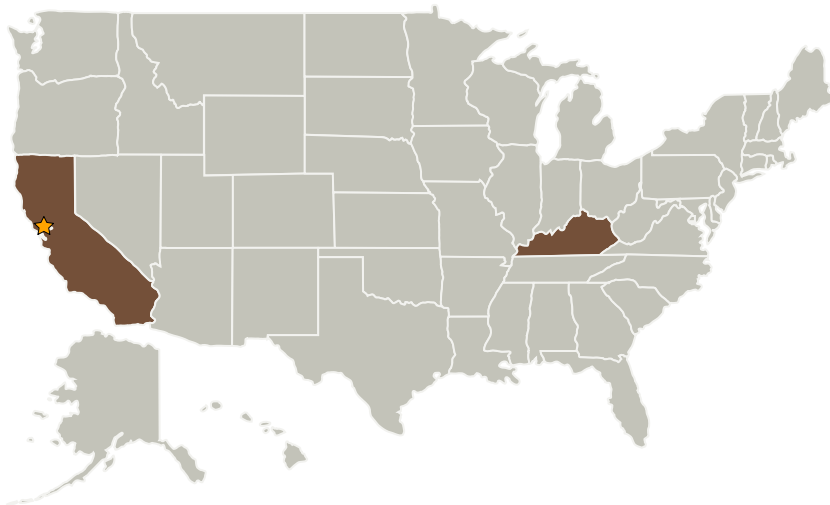
Completed Technology Project (2008 - 2008)



### Project Introduction

CFD modeling and simulation has been heavily invested in decades of manpower by a large community of researchers. However, the excessive numerical diffusion inherently caused by discretization errors plus the possibly largest/finest grid requirement for rotor wake modeling prevents CFD to be routinely used in practical engineering calculations. The proposed Gradient Transport Correction (GTC) method provides an innovative artificial compression that can serve as a general confinement for greatly enhancing the resolution of rotor wake capturing while significantly reducing the grid requirement. In this proposal, we have demonstrated the great potential of GTC method to counteract the numerical dissipation and absolutely preserve the wake vortical structure with a small number of grid cells. Phase I will develop an initial capability, and the capability to be established in Phase I will be developed into a general engineering tool that has engineering analysis accuracy as well as transparent set-up for a broad range of important engineering calculations, such as computing hover performance, high-lift and separation flows, as well as various types of multiple rotors.

### Primary U.S. Work Locations and Key Partners



Gradient Transport Correction (GTC): A General Confinement Method for Better Simulation of Rotor Wake and Vortex-Dominated Flows, Phase I

### Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	2
Project Management	2
Technology Areas	2

# Gradient Transport Correction (GTC): A General Confinement Method for Better Simulation of Rotor Wake and Vortex-Dominated Flows, Phase I

Completed Technology Project (2008 - 2008)



Organizations Performing Work	Role	Type	Location
★Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Advanced Dynamics, Inc.	Supporting Organization	Industry Minority-Owned Business	Lexington, Kentucky

## Primary U.S. Work Locations

California	Kentucky
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## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Center / Facility:

Ames Research Center (ARC)

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

### Program Director:

Jason L Kessler

### Program Manager:

Carlos Torrez

### Principal Investigator:

Patrick Hu

## Technology Areas

### Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.3 Aeroelasticity